--12. A method for forming a film, the method comprising sputtering a target, wherein

the sputtering target comprises a substrate and a target material formed on the substrate;

the target material comprises as the main component an oxygen deficient oxide;

the oxygen deficient oxide comprises a metal oxide of a chemical formula TiO_x that is deficient in oxygen as compared with a stoichiometric composition of the metal oxide; and

$1<x<2$.

13. The method according to Claim 12, wherein the sputtering is DC sputtering.

14. The method according to Claim 12, wherein the target has a resistivity of at most 10 Ωcm.

15. The method according to Claim 12, wherein the target has a resistivity of at most 1 Ωcm.

16. The method according to Claim 12, wherein the target further comprises an oxide of at least one metal selected from the group consisting of Cr, Ce, Y, Si, Al and B.

17. The method according to Claim 16, wherein the target contains the oxide of at least one metal in an amount of at most 20 wt%.

18. The method according to Claim 12, wherein the sputtering is carried out in an argon atmosphere or in a mixed atmosphere of argon and oxygen.

19. The method according to Claim 18, wherein the mixed atmosphere of argon and oxygen comprises at most 30 vol% oxygen.

20. The method according to Claim 12, further comprising forming a film having a refractive index of 2.4.

10 21. A sputtering target comprising

a substrate;

a target material formed on the substrate; and

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an undercoat of a metal or alloy between the target material and the substrate, wherein the target material comprises as the main component an oxygen deficient oxide;

the oxygen deficient oxide comprises a metal oxide of a chemical formula TiO_x that is deficient in oxygen as compared with a stoichiometric composition of the metal oxide; and

$1<x<2$.

11 22. The sputtering target according to Claim 10, wherein the undercoat has a thermal expansion coefficient between a thermal expansion coefficient of the target material and a thermal expansion coefficient of the substrate.

13 23. The sputtering target according to Claim 10, wherein the undercoat comprises

a first layer, which is adjacent to the substrate and which has a thermal expansion coefficient between the thermal expansion coefficient of the target material and the thermal expansion coefficient of the substrate; and

a second layer, which is adjacent to the target material and which has a thermal expansion coefficient within a range of $\pm$ 2 x 10^{-6}/°C of a thermal expansion coefficient of the target material.

14 24. The sputtering target according to Claim 10, wherein the undercoat comprises a material selected from the group consisting of Mo, Ti, Ni, Nb, Ta, W, Ni-Al, Ni-Cr, Ni-Cr-Al, Ni-Cr-Al-Y and Ni-Co-Cr-Al-Y.

15 25. The sputtering target according to 10, wherein the undercoat has a thickness of from 30 to 100 μm.

12 26. The sputtering target according to Claim 11, wherein the thermal expansion coefficient of the undercoat is from 12 x 10^{-6} to 15 x 10^{-6}/°C.

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16 ~~27~~. The sputtering target according to Claim 10 ~~21~~, wherein the undercoat has a thermal expansion coefficient within a range of ± 2 x 10^{-6}/°C of a thermal expansion coefficient of the target material.

17 ~~28~~. The sputtering target according to Claim 16 ~~27~~, wherein the thermal expansion coefficient of the undercoat is from 4 x 10^{-6} to 11 x 10^{-6}/°C.

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29. The sputtering target according to Claim 21, wherein the target material has a thickness of from 2 to 10 nm.

19 ~~30~~. The sputtering target according to Claim 10 ~~21~~, wherein the target has a resistivity of at most 10 Ωcm.

20 ~~31~~. The sputtering target according to Claim 10 ~~21~~, wherein the target has a resistivity of at most 1 Ωcm.

21 ~~32~~. The sputtering target according to Claim 10 ~~21~~, wherein the target material further comprises an oxide of at least one metal selected from the group consisting of Cr, Ce, Y, Si, Al and B.

22 ~~33~~. The sputtering target according to Claim 21 ~~32~~, wherein the oxide of at least one metal is contained in an amount of at most 20 wt.%.

23 ~~34~~. A method of making a sputtering target, the method comprising

providing an undercoat on a substrate;

depositing a target material on the undercoat; and

forming the sputtering target of Claim 10 ~~21~~.

24 ~~35~~. The method of Claim 23 ~~34~~, wherein the depositing comprises plasma spraying.

25 ~~36~~. A method of using a sputtering target, the method comprising sputtering the sputtering target of Claim 10 ~~21~~.--

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